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long with this species. The first name in the Sydow list, *C. angustifolia,* is a clerical error for *C. ligusticifolia.*

No. 1218. PUCCINIA BAKERIANA Arth. is a synonym of *P. Ellisii* De T., and the host is not a species of *Heracleum,* but *Angelica tomentosa.* The error in determination of the host was pointed out by the collector, after publication. Errors like this would not be so frequent if collectors would make more liberal packets, and especially be careful to include whole leaves, parts of stems, inflorescence, etc., so that the mycologist may have some material on which to found a judgment regarding the host as well as the fungus.

In the above notes it has been the attempt to include matters of fact only, and not to introduce questions of opinion or matters not yet fully established. In order to keep this article within reasonable limits, most of the data upon which the statements are based, have been omitted, but it may be assumed that in every instance proof could be supplied by the writer that would meet the approval of Dr. Sydow and other mycologists.

AGARICUS AMYGDALINUS M.A.C.

EDWARD READ MEMMINGER.

As far as our research shows, *Agaricus amygdalinus* has never been technically described, and the first appearance of the name in print was in Curtis's List of the Fungi in the Geological and Natural History Survey of North Carolina published in 1867. It is not surprising, therefore, that so little being known about this species, even its existence has been questioned.

Dr. Farlow, in an interesting paper, entitled "Notes on Agaricus Amygdalinus, M. A. Curtis," published in the Proceedings of the Boston Society of Natural History, Vol. 26, has brought together all the known facts, and to this paper we wish to acknowledge our indebtedness for much that follows. It is our intention, in this paper, to review these facts, and to introduce others that lead us to the opinion that the plant, named *Agaricus amygdalinus* by Curtis, still grows in the Southern States, and is, perhaps, entitled to specific recognition.

We think it susceptible of proof, that this plant was first published by Curtis as *Agaricus fabaceus* Berk., then this determination not proving satisfactory, it was united by Ravenel with Ag. *campestris* Linn.; dissatisfaction still existing it was finally segregated as *Agaricus amygdalinus* by Curtis.

Its first appearance and publication as *Agaricus fabaceus* Berk. was in Silliman's Journal, Vol. 8, 2d Ser., p. 401. "Agaricus Fabaceus Berk.! Ad terram pinguem. July-Nov. Santa Canal. Rav. and Society Hill. First discovered in Ohio by Mr. Lea. This is among the most delicious species for the table. The fresh specimen has a distinct taste and odor of peach kernels or bitter almonds, which are nearly lost in being cooked."

It will be noted that in Berkeley's description of *Agaricus fabaceus* it is said that "when young it has a peculiar but not unpleasant smell." Berkeley's descriptions was published in Hooker's Journal of Botany in 1848; one year after Curtis's article in Silliman's Journal, above quoted, appeared.

Ravenel, a co-worker with Curtis, and from whom Curtis had received specimens of this plant, seems at first to have accepted this determination of this plant, for we find him writing as follows in the Charleston Med. Jour., Vol. 6, p. 190, 1851.

> "No. 36. Psaliota Campestris. Linn. Aut. roadsides and green lawns.
>
> "37. Psaliota fabaceus. Berk. All Summer and Autumn on the earth in fileds and gardens. Gregarious. This is the species commonly known as the 'Eatable Mushroom.' It bears a strong resemblance to *Agaricus Campestris,* the common Eatable Mushroom of Europe, the Champignon of the Paris Epicures, and most probably has been brought into use in this country by those who are familiar with the other in Europe. The *Agaricus Campestris* is more rare and both are used indiscriminately. The *Agaricus fabaceus* may always be known by its emitting an odor of almond and peach kernel when fractured."

As time passed, and with further study in the field, Ravenel seems also to have experienced doubts as to the true position of this plant, and we find him, in an address before the Aiken Vine Growing Association published in the Charleston Daily Courier of Aug. 15th, 1862, entitled, "On the Edible Mushrooms of this Country," describing the Amygdaline plant under the name of *Agaricus campestris.* This address was of course very popular in form and substance; but it shows that the he shared Curtis's doubts as to his previous determination of this plant.

Curtis finally settles the matter to his satisfaction in 1867, by creating the species *Agaricus amygdalinus.* The only description we have of this species is contained in a letter from Curtis to Berkeley Oct. 9, 1869, published in Gardner's Chronicle. The chief and only point on which he lays stress, and indeed the characteristic by which he separates this plant from its close allies, *Ag. arvensis* and *Ag. campestris,* is the strong Amygdaline odour and taste. "Indeed this may be regarded as the safest of all species for gathering, as it can be discriminated from all others even by a child or a blind person. Its taste and odour are so very like those of peach kernels or bitter almonds that almost invariably the resemblance is immediately mentioned by those who taste it crude for the first time."

This description, as far as it goes, agrees exactly with what was said of *Agaricus fabaceus* in Silliman's Jour. quoted above.

That the plant, finally described as *Agaricus amygdalinus,* is the same plant as the one formerly described as *Agaricus fabaceus* is proved, *first,* by the agreement of the two descriptions; *second,* by the facts mentioned by Dr. Farlow concerning the change made by Curtis of the labels in his copy of Ravenel's Fungi Caroliniani Exsiccati, to-wit:

> "In this connection it is of interest to know that in Curtis's copy of Ravenel's Fungi Caroliniani Exsiccati, Vol. III, No. 3, is a specimen which, according to the label, is *Agaricus fabaceus* Berk. There is a note in Curtis's handwriting stating that this number is *Agaricus Amydalinus* Curtis. Furthermore, in the Curtis Herbarium there are five specimens marked *Ag. amygdalinus,* viz.: '1243 in Arvis arenosis, June, Society Hill; 1236, in hortis et sylvis, May, 1849, Society Hill; 1045, rich soil in gardens, Nov. Santa Canal, Ravenel; 886, Sprague, Mass.;' also two unnumbered specimens collected in Aug. and Sept., 1849. In the case of the first named specimen the name was originally written *Agarius Arvensis* and afterwards corrected to *Ag. Amygdalinus.* In the other cases the name first written was *Ag. fabaceus,* changed later to *Ag. Amygdalinus.*"

Thirdly, that Curtis, after stating that *Ag. fabaceus* existed in North and South Carolina, entirely omits it from his list of Fungi of North Carolina, but places *Ag. amygdalinus* therein; and further, that in his letter to Berkeley, mentioned above, wherein he purports to give his experience with the eatble mushrooms of America, but seems to confine himself to his experience of the Carolinas, he makes no mention whatever of *Ag. fabaceus,* which, in 1849, he had said, was common, but describes at length *Ag. amygdalinus.*

Fourthly, that though Ravenel, in the article quoted above from the Charleston Med. Jour., states that *Ag. fabaceus* was the common Southern edible mushroom, and more abundant than *Ag. Campestris,* yet, in his List of the Edible Fungi of South Carolina, published in "South Carolina; Resources," etc., 1883, *Ag. fabaceus does not appear, though Ag. Amygdalinus* is mentioned therein.

Thus it seems clear that *Ag. fabaceus,* as mentioned and described by Curtis in Silliman's Jour., in 1849, and *Ag. amygdalinus* M.A.C. are intended for one and the same plant; and that both Curtis and Ravenel at first inclined to the view that the amygdaline plant approached closely enough to Berkeley's description to be placed under it, but years after, upon further study, changed their opinion and segregated it as *Ag. amygdalinus* M.A.C.

As said before, so far as is known, Curtis never published a technical description of this species. However, in a fragmentary work of his in manuscript, entitled "Esculent Fungi," which through the courtesy of his son, Rev. C. J. Curtis, I have been permitted to see and make excerpts from, we are enabled to get a more definite idea of this species.

> "Ag. Amygdalinus M. A. C. Peach-Kernel Mushroom.
>
> "This is fortunately a species that can be determined without mistakes; it is equal in flavor to the best. Indeed, when cooked it cannot be distinguished from the Pink-Gill. (Some persons pronounce this inferior to the Pink Gill, and pretend that they can distinguish them when cooked. I doubt it. Dr. Warren thinks it superior.) It resembles that very much in appearance, and is easily mistaken for it; but its strong odour and taste of peach-kernels or bitter almonds will at once determine it from all others. When cooked this peculiar flavor is dissipated entirely. To those who are fond of Mushrooms in a crude state this will be superior to all others, leaving an exceedingly pleasant after-taste on the palate. This does not affect grassy lands so much as the preceding species [*Ag. Camp.*], but is most common in cultivated manure grounds, as in gardens, also about stables and in the borders of rich woods. It is from 2-8 in. broad in the cap, according to the richness and mellowness of the soil, with a stem 2-6 in. high gradually enlarged to the base. The colour is whitish or yellowish-white in smaller specimens. In larger ones it is somewhat rusty, with small fibrous patches of the skin which partially detaches from the cap in nearly concentric circles. The gills are white before coming flesh or pink coloured, then changing to brown and black. The veil is much thicker and heavier than in the other [*Ag. Camp.*], detaching itself from the margin of the cap, and falling down upon the stem, where it hangs like a collar for a day or two.
>
> "Comes up in its proper places during Summer and Fall after rains."

Coloured plates of both forms — the large and the small — made by Rev. C. J. Curtis accompany this work.

As no one since Curtis and Ravenel seems ever to have found, in the Southern States, any plant approaching *Ag. amygdalinus* as before known, such great uncertainty surrounded the subject that C. W. Hyams, in his paper on Edible Mushrooms of North Carolina, is prompted to say rather paradoxically:

> "This plant is listed by Curtis, but no description of it can be found, and it is a very doubtful species at best. I have found no plant in this state which could possibly be this one. It is therefore admitted entirely upon his authority."

For several years, the writer has had under observation and study a plant which agrees in every particular with Curtis's description, and the accompanying plate of the small form of *Ag. amygdalinus;* so that I am convinced that it is the same plant as the one known to Curtis. As it appears in this locality I would describe it as follows:

> Pileus moist, convex, expanded, slightly umbonate, 4 cm. in diameter ,yellow shading to cream, silky fibrillose becoming floccose squamulose, squamules yellow, umbo smooth deep yellow, margin extending beyond lamellæ and sometimes fringed with remains of veil; flesh thin 3-4 mm. thick at umbo becoming thin to margin; stripe 3½-4 cm. long, bulbous, curving, tapering upward, stuffed, yellow floccose below veil, smooth and silky above. Gills adnate to free, white then pink to brown, becoming chocolate-brown. Veil superior pendant, thick, persistent floccose externally. Spores elliptical apiculate 3.5 μ-4 μ x 4.5 μ-5 μ[1] dark brown in colour.

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[1] Note. For the above spore measurements I am indebted to Mrs. Flora Patterson of the Agricultural Department.

Rather solitary in rich woods near stables. Having strong odour and taste of peach kernels or bitter almonds, odour even observable from handling without fracture. Rare but appearing every summer. Sometimes the yellow squamules are removed in age by rains or when the pileus appears cream to white in colour and smooth. The large form of this species has never been found in this locality.

It is clear that Curtis and Ravenel considered the possession by a plant of such a distinctive taste and odour to be a sufficent characterization to entitle it to specific recognition. And, indeed, their view is not without precedent in our time, as no less an authority than Prof. Massee has seen fit, in his treatment of the genus Russula to abandon Fries' classification and adopt one based entirely upon taste; and in our country our greatest authority on the Agaricaceae, Dr. Peck, has, in several cases, made "taste" of commanding importance in separating closely related species, viz., Russula ochrophylla and R. drimeia. Further and similar confirmation could be drawn from the modern treatment of Lactarius.

Recent research, however, has brought to light the fact that we have, in *Psaliota,* a group of closely related species, all of which possess these two characteristics viz: *Agaricus subrufescens, Amygdalinus, variabilis, pusillus, cretacellus,* and perhaps *arvensis* according to McIlvaine; so, unless we are to place them all under *Ag. subrufescens,* it may be advisable to create a Section "Amygdalina" to cover this group of species.

Whether *Ag. amygdalinus,* as above described, is the same as *Ag. subrufescens* is an open question. The description given by Curtis of the large form, seems to point that way, but the small form though possessing the same taste and odour, may prove to be a different species.

Moreover, it would be interesting to know if *Ag. fabaceus* does really belong to the Amygdaline group as Dr. Farlow seems to intimate. Only those who have an opportunity to study this plant in its habitat can ascertain this fact. Prof. Morgan, our only authority on this point, in his Mycologic Flora of the Miami Valley, makes no mention of its taste and odour, and in response to an inquiry from the writer said, "I myself am not very sensitive to odours, and have not noticed it particularly in this Agaric. Odours to me are like tastes, rather difficult to characterize." From this it seems clear that if *Ag. fabaceus* has an amygdaline odour and taste it must be in a very modified degree, as the taste and odour of the plant, as it grows here, could escape no one.

Dr. Farlow, in his paper so often quoted, does not add to our knowledge by giving his personal observation. The only other mention, in botanical literature which we have found on this point, is in Poreher's Med. Pois. and Diet. properties of the Crypt. Plants of the U. S., wherein he says that "Mr. Ravenel informs me that it [*Ag. fabaceus*] is an alliaceus' edible' mushroom. Whether Ravenel obtained this fact from personal observation does not appear.

From the foregoing it would seem that the geographical distribution of *Ag. amygdalinus* would be from Massachusetts to Texas. Its existence in the former state is proved by the fact that when Curtis identified Sprague's New England plant as *Ag. fabaceus* he had in view *Ag. fabaceus* as described and understood by him in his article in Silliman's Journal, which we have shown was his *Ag. Amydalinus;* and also by the fact mentioned by Dr. Farlow, that the Sprague specimen in Curtis's Herbarium was subsequently changed by Curtis himself to *Ag. amygdalinus.* We therefore have no evidence whatever of the existence of *Ag. fabaceus,* as described by Berkeley, east of the Alleghanies. That *Ag. amygdalinus* exists in North and South Carolina we have ample evidence from Curtis and Ravenel. Featherman states in his Catalogue of Plants of Louisiana, that it exists near Baton Rouge. The authority for its extension to Texas is a note, in H. W. Ravenel's handwriting, on a dried specimen in the National Herbarium, labelled *Ag. amygdalinus* Curtis and collected by Ravenel in Texas in 1869. "*Ag. amygdalinus* Curtis. The eatable mushroom of the Atlantic States. Only one specimen found in good condition, but weather so damp it preserved badly. I send it to show it belongs to the Flora of Texas. April 19. Grassy pastures near Houston."

It would seem, then, that *Ag. amygdalinus* is a regular member of the Fungal Flora of the Atlantic and Gulf States, from Massachusetts to Texas; whereas, so far as now known, *Ag. fabaceus* belongs to the Ohio Valley.

A corollary to be drawn from the above conclusions is that the addition to Berkeley's description of *Ag. fabaceus* of an amygdaline taste and odour, upon the authority of Curtis, as McIlvaine has done in his One Thousand Fungi, is incorrect and misleading.

Until, therefore, it is conclusively proved that *Ag. amygdalinus* and *Ag. fabaceus* are one and the same species, it is proper to confine the description of *Ag. fabaceus* strictly to the words of Berkeley, and no argument for the identity of these species, based on similarity of taste and odour drawn from Curtis's statement in Silliman's Journal, above quoted, can have any weight or force.